ElectroSense
Design Document

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1.Introduction

1.1 Purpose

The purpose of this document is to showcase and document the planned design of the ElectroSense system. This will include discussions on the chosen design for the in App User Interface, Sensor Interface as well as the design of our patient monitoring system connected to a mattress. Furthermore, it will define several key components of our system design for further use. Finally it will include graphs and sketches of the planned designs alongside other visuals.

1.2 Scope

The main system which is the subject of this document consists of a mattress attached to various sensors connected to a central processing unit. This goes along with an IOS app to connect to the bed via Bluetooth to be able to alert nurses of rapid changes in vitals. It will consist of a graphical user interface meant for the operator, an external interface comprised of a temperature pad and a circulation pump meant to physically affect the patient and finally a separate interface comprised of various sensors meant to gather data on the patient and display it on the app.

1.3 Intended audience

The intended audience for this project is ICU hospitals and patients around the world and the US. Our project would help healthcare workers know when something is wrong with their patient which would help make sure the ICU patients are safe and comfortable.

2. Definitions

Arduino: A computer acting as a central processing unit.

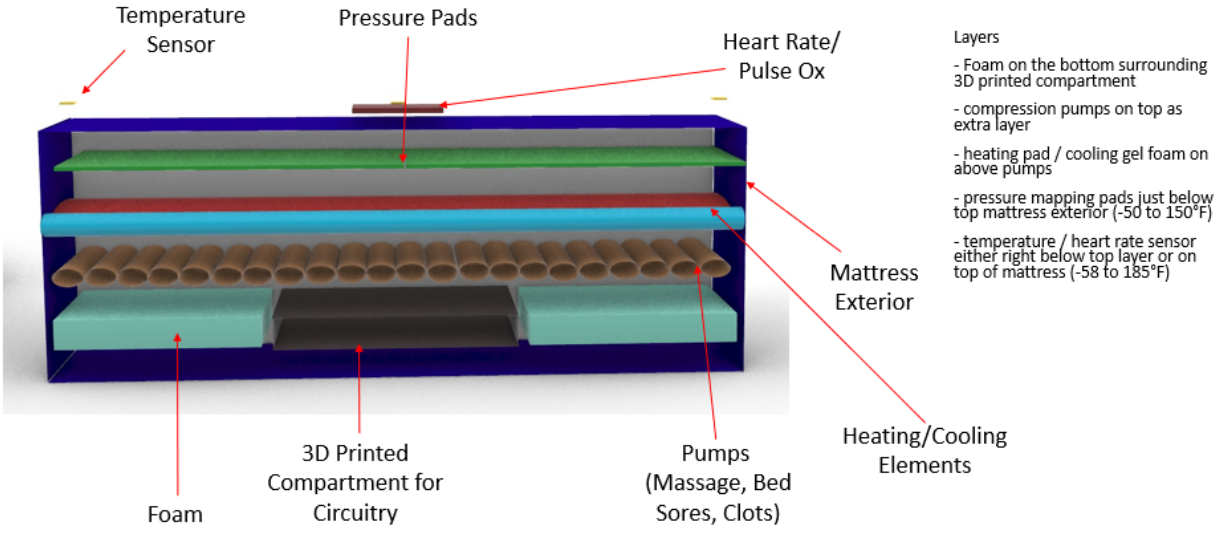
SH-08 Module: bluetooth module meant for corresponding with the Arduino

3. System Design

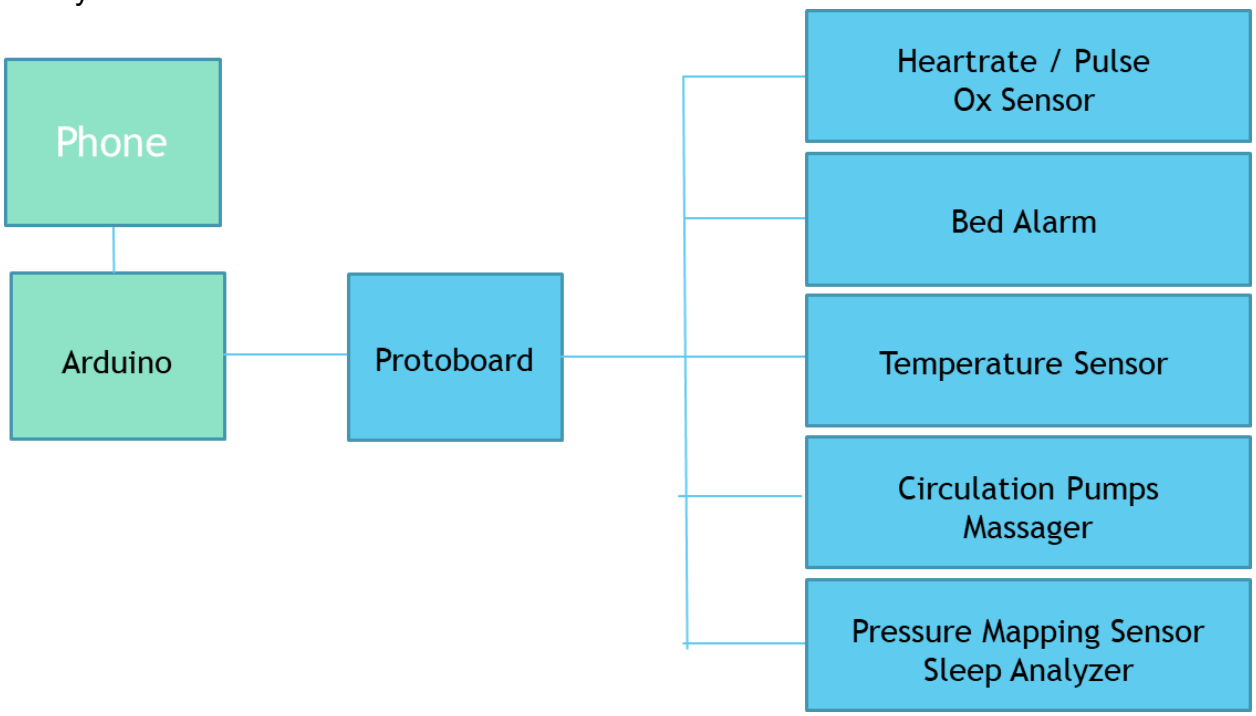
Due to the multiple components that will all have to work in unison in our system in “real-time,” we have to design the system in such a way that all the components paired with the main mattress respond to it as it sends data with tolerance for transfer errors. Therefore the main focus of our design will be the mattress itself as it will be the foundation of our project.

The mattress has to be configured to both send and receive signals from the operator's phone, however those two processes have to be completely separated in their planning but have to send receive signals over a single bluetooth connection. This separation of received signals and their directing will have to be handled by the arduino.

3.1 Design Overview



3.2 System Architecture



4. User Interface

The fact that our target customer is a medical professional, a strong degree of detail in patient data will need to be displayed to the operator in a small space subject to changes in its dimensions on a per phone basis which we will need to take into account. The app will require responsive design.

4.1 Overview of User Interface